Infrapopliteal and Critical Limb Ischemia

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TCT-521

Impact of tibial artery calcification pattern on the outcomes of below the knee intervention

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Background: Tibial artery calcification (TAC) has been reported to be associated with increased risk of amputation. However, there are little available data on the outcomes after below the knee (BTK) intervention according to the severity of TAC. In this study, we aimed to investigate the relationship of the TAC pattern with outcomes of BTK intervention.
Methods: We reviewed medical records of 109 patients (112 lesions) who underwent a lower extremity CT angiography before BTK intervention from April 2008 to May 2013. Major adverse limb event (MALE) was defined as any re-intervention or unplanned amputation of the index limb. TAC severity patterns were classified into three patterns based on the images of maximum intensity projection of lower extremity computed tomography angiogram; no evidence of calcification (38), patchy pattern (44) or linear pattern (30) of calcification.
Results: Mean age of total subjects was 68.8 ± 11.7 years. Male proportion was 85% (96). Patchy and linear pattern groups had higher prevalence of diabetes mellitus and higher Rutherford scores than no calcium group (p< 0.001, 0.002). Prevalence of chronic kidney disease was the highest in linear pattern following patchy and no calcium (63.3%, 36.4%, and 23.7%, respectively, p=0.004). More BTK run-offs were observed in the linear pattern (p=0.024). However, technical success and complications of BTK intervention did not differ according to the groups. Total 28 cases of unplanned major and minor amputations were evident during mean 2.5 years follow up; 5 (13.2%) cases in the no calcium, 9 (20.5%) in the patchy calcification, and 14 (46.7%) in the linear calcification (p=0.04). There was no difference of MALE between the groups (p=0.31). After multivariate analysis, Rutherford score and suboptimal intervention were related the unplanned amputation (HR 2.4, 95% CI 1.31-4.6; HR 2.3, 95% CI 1.1-5.0).
Conclusions: Linear pattern TAC was related higher rate of amputation after BTK intervention. This result may be related to higher baseline Rutherford score.

TCT-522

Outcomes of Laser-Assisted Balloon Angioplasty versus Balloon Angioplasty Alone for Below Knee Peripheral Arterial Disease

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Background: Laser-assisted balloon angioplasty (LABA) has been shown to be more effective in achieving angiographic success for endovascular treatment for below knee peripheral artery disease. However, long-term outcomes of LABA compared with balloon angioplasty alone (BA) for popliteal and infra-popliteal arterial intervention are not known.
Methods: We evaluated data on 731 patients (pts) undergoing LABA (n=398) and BA (n=333) retrospectively at a single center (2007- 2012). Outcomes included ipsilateral major limb amputation, revascularization and death rates at a median follow up of 35.5 months.
Results: Baseline features were similar in 2 groups with the exceptions of more LABA pts having TASC-D lesions (92.5 vs. 66.7 %; p< 0.0001) and chronic total occlusions (86.4 vs. 49.5 %; p< 0.0001). Angiographic success was higher in LABA compared with BA (97.6% vs. 89.2 %; p< 0.0001). Ipsilateral limb amputation was similar LABA and BA pts (7.3% vs. 8.1%, p=0.64) despite unfavorable baseline characteristics in the former. Independent predictors of major limb amputation included diabetes (HR 5.52, 95% CI 1.8-16.7), prior contralateral limb amputation (HR 2.24, 95% CI 1.0-5.0) and Total pre-procedural Yamasaki score (HR 1.2, 95% CI 1.1-1.4). Repeat ipsilateral revascularization was also similar in the LABA and BA pts (23.9% vs. 22.2%, p=0.56). Independent predictors of repeat revascularization included prior peripheral bypass surgery (HR 1.64, 95% CI 1.0-2.7), stroke (HR 1.44, 95% CI 1.0-2.0), diabetes (HR 1.42, 95% CI 1.0-1.9) and total pre-procedural Yamasaki score (HR 1.14, 95% CI 1.1-1.2). Death occurred 140 (35.2%) and 88 (26.4%) pts in LABA and BA respectively, reflecting the worse baseline characteristics of the LABA group.
Conclusions: LABA achieved higher angiographic success and similar ipsilateral major amputation and revascularization rates despite unfavorable baseline characteristics compared with BA pts. However, despite greater angiographic success, LABA did not appear to be associated with improved long-term mortality, suggesting that comorbidities rather than angiographic success are the key driver of death in pts undergoing below knee interventions.

TCT-523

Therapeutic Potential Of Sustained Release Sodium Nitrite For Critical Limb Ischemia In The Setting Of Metabolic Syndrome

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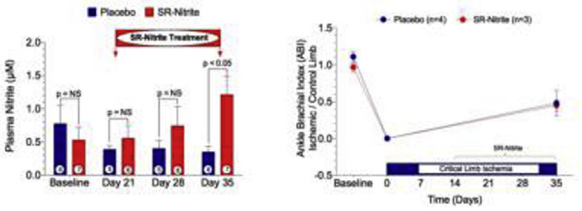
Background: The pursuit of treatments for critical limb ischemia (CLI) remains a priority due to the devastating implications of this disease. Nitric oxide (NO)-based therapies have emerged as effective treatments for ischemic injury by promoting vasodilation and angiogenesis and by prevention of tissue necrosis. We investigated a novel sustained release formulation of nitrite (SR-Nitrite) in a clinically relevant swine model of CLI involving metabolic syndrome (MetS).
Methods: Obese Ossabaw miniswine (n=18) were subjected to percutaneous implantation of a covered stent in combination with an Amplatzer occluder in the external iliac to induce CLI. At 14 days following CLI, pigs were randomized to placebo (n=9) or SR-Nitrite (n=9) therapy for 21 days. Plasma and skeletal muscle were collected for molecular analysis and NO measurements.
Results: SR-Nitrite therapy increased plasma and skeletal muscle nitrite and S-Nitrosothiol levels at 35 days post-CLI. Analysis of VEGF and markers for endothelial cell proliferation (CD31 and vWF) revealed that SR-Nitrite promoted angiogenic signaling in the ischemic limb. SR-Nitrite also significantly reduced oxidative stress in the ischemic limb. However, we failed to observe improvement in Ankle Brachial Index (ABI) or collateral vessel growth measured by angiography.
Conclusions: In a clinically relevant model of MetS and CLI, SR-Nitrite treatment restored NO levels, induced angiogenic signaling, and reduced ischemic limb oxidative stress. However, nitrite failed to improve lower limb blood flow and promote large vessel collateralization.



TCT-524

Physiologic Guidance of Infrainguinal Vascular Interventions Using the Pressure Wire

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Background: The role of measuring translesional pressure gradients (TLG) via pressure wire during infrainguinal vascular interventions is not well understood. This study seeks to evaluate the relationship between resting and hyperemic TLG (RG, HG) and in-lesion peak systolic velocity (PSV-L), PSV-L to pre-lesion PSV ratio (PSV-R), measured by Duplex US, and ankle-brachial indices (ABI), before and after an intervention.
Methods: In 25 patients with focal infrainguinal arterial stenosis, TLG at rest (RG) and after hyperemia (HG) were measured via a pressure wire before and after angioplasty. All patients had periprocedural ABI and Duplex US evaluation, recording PSV-L, and PSV-R. A Pearson R correlation coefficient was calculated.
Results: Mean age was 73±12 years, 70% were men, median Rutherford class 3. At baseline and after the angioplasty, mean ABI was 0.78±0.2, and 0.99±0.1, mean PSV-L was 459±110m/sec and 126±35 m/sec, and mean PSV-R was 6.7±4 and 1.2±0.5 respectively. RG and HG significantly improved (p< 0.001) from baseline to after angioplasty (29±20 to 5±13 mm Hg, and 40±21 to 10±13 mmHg respectively). The correlations between the TLG's and PSV-L, PSV-R, and ABI's, as well as the change in TLG versus the change in PSV-L, PSV-R, ABI before and after angioplasty are shown in the table.